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\* W E L C O M E T O T H E \*  
\* U . S . P A T E N T T E X T F I L E \*  
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=> s parvovirus

L1 341 PARVOVIRUS

=> s l1 and vector

60478 VECTOR  
L2 195 L1 AND VECTOR

=> s l1 and therapy

38208 THERAPY  
L3 168 L1 AND THERAPY

=> s l3 and cancer

22994 CANCER  
L4 98 L3 AND CANCER

=> d ti 1-93

US PAT NO:	5,789,230 [IMAGE AVAILABLE]	L4: 1 of 98
TITLE:	Endosomolytically active particles	
US PAT NO:	5,789,200 [IMAGE AVAILABLE]	L4: 2 of 98
TITLE:	Human ETS family member, ELF3	
US PAT NO:	5,786,340 [IMAGE AVAILABLE]	L4: 3 of 98
TITLE:	Gene transfer to the intestine	
US PAT NO:	5,786,211 [IMAGE AVAILABLE]	L4: 4 of 98
TITLE:	Adeno-associated virus materials and methods	
US PAT NO:	5,786,204 [IMAGE AVAILABLE]	L4: 5 of 98
TITLE:	Human prostatic specific reductase	
US PAT NO:	5,786,193 [IMAGE AVAILABLE]	L4: 6 of 98
TITLE:	Human geranylgeranyl pyrophosphate synthetase	
US PAT NO:	5,780,286 [IMAGE AVAILABLE]	L4: 7 of 98
TITLE:	Arginase II	
US PAT NO:	5,780,263 [IMAGE AVAILABLE]	L4: 8 of 98
TITLE:	Human CCN-like growth factor	
US PAT NO:	5,776,729 [IMAGE AVAILABLE]	L4: 9 of 98
TITLE:	Human G-protein receptor HGBER32	
US PAT NO:	5,773,583 [IMAGE AVAILABLE]	L4: 10 of 98
TITLE:	Methods and materials relating to the functional domains of DNA binding proteins	
US PAT NO:	5,773,252 [IMAGE AVAILABLE]	L4: 11 of 98
TITLE:	Fibroblast growth factor 15	
US PAT NO:	5,766,625 [IMAGE AVAILABLE]	L4: 12 of 98

TITLE:	Artificial viral envelopes	
US PAT NO:	5,763,213 [IMAGE AVAILABLE]	L4: 13 of 98
TITLE:	Nucleic acid encoding novel human G-protein coupled receptor	
US PAT NO:	5,763,216 [IMAGE AVAILABLE]	L4: 14 of 98
TITLE:	Gene encoding a human reduced folate carrier (RFC)	
US PAT NO:	5,763,214 [IMAGE AVAILABLE]	L4: 15 of 98
TITLE:	Fibroblast growth factor 11	
US PAT NO:	5,763,209 [IMAGE AVAILABLE]	L4: 16 of 98
TITLE:	Methods and materials relating to the functional domains of DNA binding proteins	
US PAT NO:	5,762,907 [IMAGE AVAILABLE]	L4: 17 of 98
TITLE:	Frozen radiopharmaceutical formulations	
US PAT NO:	5,759,852 [IMAGE AVAILABLE]	L4: 18 of 98
TITLE:	Expression vector containing PL6M promoter and TAT32 ribosome binding site and host cells transformed therewith	
US PAT NO:	5,759,808 [IMAGE AVAILABLE]	L4: 19 of 98
TITLE:	Immunoglobulins devoid of light chains	
US PAT NO:	5,759,554 [IMAGE AVAILABLE]	L4: 20 of 98
TITLE:	Immunostimulatory bacterial cell wall traction	
US PAT NO:	5,756,309 [IMAGE AVAILABLE]	L4: 21 of 98
TITLE:	Nucleic acid encoding a human G-protein receptor HPRAJ70 and method of producing the receptor	
US PAT NO:	5,756,284 [IMAGE AVAILABLE]	L4: 22 of 98
TITLE:	Self-assembling recombinant papillomavirus capsid proteins	
US PAT NO:	5,756,283 [IMAGE AVAILABLE]	L4: 23 of 98
TITLE:	Method for improved production of recombinant adeno-associated viruses for gene <b>therapy</b>	
US PAT NO:	5,753,500 [IMAGE AVAILABLE]	L4: 24 of 98
TITLE:	Helper-free stocks of recombinant adeno-associated virus vectors	
US PAT NO:	5,753,258 [IMAGE AVAILABLE]	L4: 25 of 98
TITLE:	Artificial viral envelopes	
US PAT NO:	5,750,370 [IMAGE AVAILABLE]	L4: 26 of 98
TITLE:	Nucleic acid encoding human endothlein-bombesin receptor and method of producing the receptor	
US PAT NO:	5,747,312 [IMAGE AVAILABLE]	L4: 27 of 98
TITLE:	Human AlkB polypeptide	
US PAT NO:	5,747,280 [IMAGE AVAILABLE]	L4: 28 of 98
TITLE:	Human vascular IBP-like growth factor	
US PAT NO:	5,744,142 [IMAGE AVAILABLE]	L4: 29 of 98
TITLE:	Self-assembling recombinant papillomavirus capsid proteins	
US PAT NO:	5,741,683 [IMAGE AVAILABLE]	L4: 30 of 98
TITLE:	In vitro packaging of adeno-associated virus DNA	
US PAT NO:	5,739,118 [IMAGE AVAILABLE]	L4: 31 of 98

TITLE:	Compositions and methods for delivery of genetic material	
US PAT NO:	5,733,748 [IMAGE AVAILABLE]	L4: 32 of 98
TITLE:	Colon specific genes and proteins	
US PAT NO:	5,731,182 [IMAGE AVAILABLE]	L4: 33 of 98
TITLE:	Non-mammalian DNA virus to express an exogenous gene in a mammalian cell	
US PAT NO:	5,730,969 [IMAGE AVAILABLE]	L4: 34 of 98
TITLE:	Method and compositions for solubilization and stabilization of polypeptides, especially proteins	
US PAT NO:	5,728,546 [IMAGE AVAILABLE]	L4: 35 of 98
TITLE:	Fibroblast growth factor 13	
US PAT NO:	5,723,311 [IMAGE AVAILABLE]	L4: 36 of 98
TITLE:	Human DNA topoisomerase I .alpha.	
US PAT NO:	5,716,806 [IMAGE AVAILABLE]	L4: 37 of 98
TITLE:	Human inositol monophosphatase H1 polynucleotides	
US PAT NO:	5,716,788 [IMAGE AVAILABLE]	L4: 38 of 98
TITLE:	Antibodies to human reduced folate carrier protein	
US PAT NO:	5,716,620 [IMAGE AVAILABLE]	L4: 39 of 98
TITLE:	Self-assembling recombinant papillomavirus capsid proteins	
US PAT NO:	5,710,024 [IMAGE AVAILABLE]	L4: 40 of 98
TITLE:	Polynucleotides that encode the calcitonin gene-related peptide receptor component factor (HOUNDC44)	
US PAT NO:	5,710,019 [IMAGE AVAILABLE]	L4: 41 of 98
TITLE:	Human potassium channel 1 and 2 proteins	
US PAT NO:	5,709,996 [IMAGE AVAILABLE]	L4: 42 of 98
TITLE:	Self-assembling recombinant papillomavirus capsid proteins	
US PAT NO:	5,707,969 [IMAGE AVAILABLE]	L4: 43 of 98
TITLE:	Treatment of diseases by site-specific instillation of cells or site-specific transformation of cells and kits therefor	
US PAT NO:	5,707,865 [IMAGE AVAILABLE]	L4: 44 of 98
TITLE:	Retroviral vectors for expression in embryonic cells	
US PAT NO:	5,702,919 [IMAGE AVAILABLE]	L4: 45 of 98
TITLE:	DNA encoding canine granulocyte macrophage colony stimulating factor	
US PAT NO:	5,698,531 [IMAGE AVAILABLE]	L4: 46 of 98
TITLE:	Treatment of diseases by site-specific instillation of cells or site-specific transformation of cells and kits therefor	
US PAT NO:	5,698,446 [IMAGE AVAILABLE]	L4: 47 of 98
TITLE:	Methods and compositions for inhibiting production of replication competent virus	
US PAT NO:	5,695,980 [IMAGE AVAILABLE]	L4: 48 of 98
TITLE:	Polynucleotides, vectors, cells and an expression method for human MutT2	
US PAT NO:	5,693,508 [IMAGE AVAILABLE]	L4: 49 of 98
TITLE:	Retroviral expression vectors containing	

US PAT NO:	5,688,772 [IMAGE AVAILABLE]	L4: 50 of 98
TITLE:	Quinoa saponin compositions and methods of use	
US PAT NO:	5,688,676 [IMAGE AVAILABLE]	L4: 51 of 98
TITLE:	In vitro packaging of adeno-associated virus DNA	
US PAT NO:	5,688,675 [IMAGE AVAILABLE]	L4: 52 of 98
TITLE:	In vitro packaging of adeno-associated virus DNA	
US PAT NO:	5,686,486 [IMAGE AVAILABLE]	L4: 53 of 98
TITLE:	4-hydroxy-benzopyran-2-ones and 4-hydroxy-cycloalkyl[b]pyran-2-ones useful to treat retroviral infections	
US PAT NO:	5,686,113 [IMAGE AVAILABLE]	L4: 54 of 98
TITLE:	Microcapsules of predetermined peptide(s) specificity (ies), their preparation and uses	
US PAT NO:	5,677,158 [IMAGE AVAILABLE]	L4: 55 of 98
TITLE:	In vitro packaging of adeno-associated virus DNA	
US PAT NO:	5,674,870 [IMAGE AVAILABLE]	L4: 56 of 98
TITLE:	Anti-cancer uses for barbituric acid analogs	
US PAT NO:	5,662,896 [IMAGE AVAILABLE]	L4: 57 of 98
TITLE:	Compositions and methods for cancer immunotherapy	
US PAT NO:	5,658,785 [IMAGE AVAILABLE]	L4: 58 of 98
TITLE:	Adeno-associated virus materials and methods	
US PAT NO:	5,658,758 [IMAGE AVAILABLE]	L4: 59 of 98
TITLE:	Polynucleotides encoding cytosstatin I	
US PAT NO:	5,654,172 [IMAGE AVAILABLE]	L4: 60 of 98
TITLE:	Gaba.sub.a receptor epsilon subunit	
US PAT NO:	5,650,313 [IMAGE AVAILABLE]	L4: 61 of 98
TITLE:	Ubiquitin conjugating enzymes 8 and 9	
US PAT NO:	5,650,295 [IMAGE AVAILABLE]	L4: 62 of 98
TITLE:	Macrophage migration inhibitory factor-3	
US PAT NO:	5,646,034 [IMAGE AVAILABLE]	L4: 63 of 98
TITLE:	Increasing rAAV titer	
US PAT NO:	5,631,219 [IMAGE AVAILABLE]	L4: 64 of 98
TITLE:	Method of stimulating hematopoiesis with hemoglobin	
US PAT NO:	5,622,856 [IMAGE AVAILABLE]	L4: 65 of 98
TITLE:	High efficiency helper system for AAV vector production	
US PAT NO:	5,618,717 [IMAGE AVAILABLE]	L4: 66 of 98
TITLE:	DNA encoding human AlkB	
US PAT NO:	5,618,536 [IMAGE AVAILABLE]	L4: 67 of 98
TITLE:	Chimeric papillomavirus-like particles	
US PAT NO:	5,604,090 [IMAGE AVAILABLE]	L4: 68 of 98
TITLE:	Method for increasing transduction of cells by adeno-associated virus vectors	
US PAT NO:	5,597,807 [IMAGE AVAILABLE]	L4: 69 of 98
TITLE:	Quinoa saponin compositions and methods of use	

US PAT NO:	5,593, [IMAGE AVAILABLE]	: 70 of 98
TITLE:	Genetic immunization	
US PAT NO:	5,593,861 [IMAGE AVAILABLE]	L4: 71 of 98
TITLE:	Dog-mouse heterohybridoma and gene fragment coding for constant region of canine immunoglobulins	
US PAT NO:	5,585,254 [IMAGE AVAILABLE]	L4: 72 of 98
TITLE:	Autonomous <b>parvovirus</b> gene delivery vehicles and expression vectors	
US PAT NO:	5,550,213 [IMAGE AVAILABLE]	L4: 73 of 98
TITLE:	Inhibitors of urokinase plasminogen activator	
US PAT NO:	5,545,563 [IMAGE AVAILABLE]	L4: 74 of 98
TITLE:	Human C/EBP gene and vectors for its expression	
US PAT NO:	5,543,391 [IMAGE AVAILABLE]	L4: 75 of 98
TITLE:	Covalent microparticle-drug conjugates for biological targeting	
US PAT NO:	5,543,390 [IMAGE AVAILABLE]	L4: 76 of 98
TITLE:	Covalent microparticle-drug conjugates for biological targeting	
US PAT NO:	5,510,256 [IMAGE AVAILABLE]	L4: 77 of 98
TITLE:	Eliminating internal initiation of soluble CD4 gene	
US PAT NO:	5,504,198 [IMAGE AVAILABLE]	L4: 78 of 98
TITLE:	Cat-mouse heterohybridoma and gene fragment coding for constant region of feline immunoglobulin	
US PAT NO:	5,491,073 [IMAGE AVAILABLE]	L4: 79 of 98
TITLE:	Cloning of chicken anaemia DNA	
US PAT NO:	5,489,590 [IMAGE AVAILABLE]	L4: 80 of 98
TITLE:	Method of treating with therapeutic composition comprising photoactive compound	
US PAT NO:	5,474,935 [IMAGE AVAILABLE]	L4: 81 of 98
TITLE:	Adeno-associated virus (AAV)-based eucaryotic vectors	
US PAT NO:	5,466,449 [IMAGE AVAILABLE]	L4: 82 of 98
TITLE:	Antibacterial composition and method of use	
US PAT NO:	5,437,951 [IMAGE AVAILABLE]	L4: 83 of 98
TITLE:	Self-assembling recombinant papillomavirus capsid proteins	
US PAT NO:	5,436,146 [IMAGE AVAILABLE]	L4: 84 of 98
TITLE:	Helper-free stocks of recombinant adeno-associated virus vectors	
US PAT NO:	5,328,470 [IMAGE AVAILABLE]	L4: 85 of 98
TITLE:	Treatment of diseases by site-specific instillation of cells or site-specific transformation of cells and kits therefor	
US PAT NO:	5,254,572 [IMAGE AVAILABLE]	L4: 86 of 98
TITLE:	Method and composition for supplementing vitamin B6 where the PN-PLP pathway is disturbed	
US PAT NO:	5,252,479 [IMAGE AVAILABLE]	L4: 87 of 98
TITLE:	Safe vector for gene <b>therapy</b>	

US PAT NO: 5,232,844 [IMAGE AVAILABLE] L4: 88 of 98  
TITLE: Photodynamic inactivation of viruses in cell-containing compositions

US PAT NO: 5,215,745 [IMAGE AVAILABLE] L4: 89 of 98  
TITLE: Method for treating viral diseases with attenuated virus

US PAT NO: 5,200,182 [IMAGE AVAILABLE] L4: 90 of 98  
TITLE: Antiviral or antibacterial composition and method of use

US PAT NO: 5,177,073 [IMAGE AVAILABLE] L4: 91 of 98  
TITLE: Therapeutic compositions derived from photoactive compounds

US PAT NO: 5,124,148 [IMAGE AVAILABLE] L4: 92 of 98  
TITLE: Method for treating viral diseases with attenuated virus

US PAT NO: 5,106,616 [IMAGE AVAILABLE] L4: 93 of 98  
TITLE: Administration of acemannan

=> d 72 ab

US PAT NO: 5,585,254 [IMAGE AVAILABLE] L4: 72 of 98

ABSTRACT:

The present invention relates to novel recombinant autonomous **parvovirus** vectors, novel recombinant virus particles, and novel gene delivery vehicles that can be used to selectively target heterologous nucleic acid sequences to desired cell types and to selectively express such sequences in such desired cell types. Recombinant autonomous **parvovirus** gene delivery vehicles are particularly advantageous for transient gene **therapy**, and are especially well-suited to treat diseases in which there is rapid cell growth, such as **cancer**. Also included is the use of recombinant vectors of the present invention to produce RNA and protein products in cell culture.

=> d 72

72. 5,585,254, Dec. 17, 1996, Autonomous **parvovirus** gene delivery vehicles and expression vectors; Ian H. Maxwell, et al., 435/172.3; 424/93.2, 405; 435/69.1, 70.3, 91.1, 91.21, 91.3, 91.31, 91.32, 235.1, 320.1; 536/23.1, 23.7, 24.1, 24.5 [IMAGE AVAILABLE]

=> d clms 72

US PAT NO: 5,585,254 [IMAGE AVAILABLE] L4: 72 of 98

CLAIMS:

CLMS(1)

What is claimed is:

1. A recombinant vector comprising nucleic acid sequences of an autonomous **parvovirus** joined to at least one heterologous nucleic acid sequence, said autonomous **parvovirus** nucleic acid sequences comprising functional left and right end inverted terminal repeats, said heterologous nucleic acid sequence being located between and operably linked to said nucleic acid sequences comprising said left and right inverted terminal repeats, wherein said vector is in a non-integrating form when transferred into a cell.

CLMS (2)

2. The vector of claim 1, wherein said heterologous nucleic acid sequence is selected from the group consisting of a heterologous control element and a heterologous coding region, said heterologous control element being operably linked to said heterologous coding region.

CLMS (3)

3. The vector of claim 1, wherein said heterologous control element comprises a heterologous response element.

CLMS (4)

4. The vector of claim 1, wherein said heterologous nucleic acid sequence comprises a heterologous control element operatively linked to a heterologous coding region.

CLMS (5)

5. The vector of claim 1, wherein said heterologous nucleic acid sequence comprises at least one heterologous response element operatively linked to a promoter selected from the group consisting of an autonomous **parvovirus** promoter and a heterologous promoter.

CLMS (6)

6. The vector of claim 2, wherein said heterologous control element is operatively linked to at least one coding region selected from the group consisting of an autonomous **parvovirus** coding region and said heterologous coding region.

CLMS (7)

7. The vector of claim 2, wherein said heterologous coding region is operatively linked to a transcription control sequence selected from the group consisting of an autonomous **parvovirus** transcription control sequence that regulates the expression of **parvovirus** nonstructural polypeptide genes, an autonomous **parvovirus** transcription control sequence that regulates the expression of **parvovirus** structural polypeptide genes, and a heterologous transcription control sequence comprising a promoter and at least one heterologous response element.

CLMS (8)

8. The vector of claim 1, wherein said vector is packaged into a virus particle.

CLMS (9)

9. The vector of claim 1, wherein said **parvovirus** nucleic acid sequences are selected from the group consisting of LuIII **parvovirus**, minute virus of mice, hamster **parvovirus**, feline panleukopenia virus, canine **parvovirus**, porcine **parvovirus**, latent rat virus, mink enteritis virus, human **parvovirus**, bovine **parvovirus**, and Aleutian mink disease **parvovirus** nucleic acid sequences.

CLMS (10)

10. The vector of claim 1, wherein said **parvovirus** nucleic acid sequences are selected from the group consisting of LuIII **parvovirus**, minute virus of mice MVMi, minute virus of mice MVMp, and hamster **parvovirus** Hi nucleic acid sequences.

CLMS (11)

11. The vector of claim 1, wherein said **parvovirus** nucleic acid sequences comprise a **LuIII** **parvovirus** nucleic acid sequence.

CLMS(12)

12. The vector of claim 2, wherein said heterologous coding region is operatively linked to an autonomous **parvovirus** P4 transcription control sequence.

CLMS(13)

13. The vector of claim 2, wherein said heterologous coding region is operatively linked to a **LuIII** P4 transcription control sequence.

CLMS(14)

14. The vector of claim 1, wherein said heterologous nucleic acid sequence is selected from the group consisting of a cell-selective response element, a hormone receptor response element, an antibiotic response element, and a carbohydrate response element.

CLMS(15)

15. The vector of claim 14, wherein said cell-selective response element is capable of being activated by a trans-activating regulatory element selectively produced in a cell type to which said vector is targeted.

CLMS(16)

16. The vector of claim 15, wherein said cell type is selected from the group consisting of a **cancer** cell and a cell infected by an infectious agent.

CLMS(17)

17. The vector of claim 1, wherein said heterologous nucleic acid sequence is selected from the group consisting of a tetracycline response element, a **GAL4** response element, a progesterone receptor response element, a glucocorticoid receptor response element, an immunoglobulin kappa light chain enhancer, an immunoglobulin heavy chain enhancer, an .alpha.-1-antitrypsin enhancer, a serum albumin enhancer, a chorionic gonadotropin .alpha.-chain enhancer, a chorionic gonadotropin .beta.-chain enhancer, an **IL-2** enhancer, an **IL-2** receptor enhancer, and an **HIV** response element.

CLMS(18)

18. The vector of claim 1, wherein said heterologous nucleic acid sequence encodes a functional protein selected from the group consisting of a cytotoxic agent, an immunopotentiator, a vaccine antigen and functional equivalents thereof.

CLMS(19)

19. The vector of claim 1, wherein said heterologous nucleic acid sequence encodes a functional protein selected from the group consisting of a diphtheria toxin, a ricin toxin, a modeccin toxin, an abrin toxin, a *Pseudomonas* exotoxin, a shiga toxin, a pokeweed antiviral protein, .alpha.-amanitin, a ribosome inhibiting protein, an autonomous **parvovirus** nonstructural protein, **HSV** thymidine kinase, and functional equivalents thereof.

CLMS(20)

20. The vector of claim 1, wherein said heterologous nucleic acid sequence encodes a functional protein selected from the group consisting of a diphtheria A-chain toxin, an autonomous **parvovirus** NS1 protein, HSV thymidine kinase, and functional equivalents thereof.

CLMS (21)

21. The vector of claim 1, wherein said heterologous nucleic acid sequence encodes a functional RNA selected from the group consisting of an antisense RNA, a ribozyme, and an RNA-based drug.

CLMS (22)

22. The vector of claim 1, wherein said heterologous nucleic acid sequence encodes a marker protein.

CLMS (23)

23. The vector of claim 1, wherein said **parvovirus** nucleic acid sequences comprise the terminal repeats of said **parvovirus** and at least one transcription control sequence selected from the group consisting of a transcription control sequence that regulates the expression of autonomous **parvovirus** nonstructural polypeptide genes and a transcription control sequence that regulates the expression of autonomous **parvovirus** structural polypeptide genes.

CLMS (24)

24. The vector of claim 1, wherein said heterologous nucleic acid sequences replace autonomous **parvovirus** sequences from about nucleotide 265 to about nucleotide 4530, wherein said heterologous sequences share substantial homology with LUIII.

CLMS (25)

25. The vector of claim 1, wherein said heterologous nucleic acid sequences replace autonomous **parvovirus** sequences from about nucleotide 145 to about nucleotide 4677, wherein said heterologous sequences share substantial homology with LUIII.

CLMS (26)

26. The vector of claim 1 wherein introduction of said vector into a host cell effects transient gene transfer of said heterologous coding region into said cell.

CLMS (27)

27. The vector of claim 2, wherein said heterologous control element comprises a **cancer** cell-selective response element, wherein said heterologous coding region encodes a cytotoxic agent, and wherein said vector upon introduction into a host **cancer** cell inhibits **cancer** cell growth.

CLMS (28)

28. The vector of claim 1, wherein said vector comprises a single stranded DNA molecule.

CLMS (29)

29. The vector of claim 1, wherein said vector comprises a double stranded DNA plasmid.

CLMS (30)

30. The vector of claim 1, wherein said vector is selected from the group consisting of pGLuLUC.DELTA.SV and pTOLuLUC.

CLMS(31)

31. The vector of claim 1, wherein said vector self-amplifies when provided with viral non-structural proteins by genetically-transformed host cell.

CLMS(32)

32. The vector of claim 1, wherein said vector is self-amplification incompetent.

CLMS(33)

33. The vector of claim 1, wherein said vector is self-packaging when provided with vector-packaging proteins by a genetically-transformed host cell.

CLMS(34)

34. The vector of claim 1, wherein said vector is self-packaging incompetent.

CLMS(35)

35. A recombinant virus particle comprising a recombinant vector packaged in an autonomous marvovirus capsid, said vector comprising nucleic acid sequences of an autonomous **parvovirus** joined to at least one heterologous nucleic acid sequence, said autonomous **parvovirus** nucleic acid sequences comprising functional left and right end inverted terminal repeats, said heterologous nucleic acid sequence being located between and operably linked to said nucleic acid sequences comprising said left and right inverted terminal repeats, wherein said vector is in a non-integrating form when transferred into a cell.

CLMS(36)

36. A recombinant virus particle comprising a recombinant vector packaged in an autonomous **parvovirus** capsid, said vector comprising nucleic acid sequences of an autonomous **parvovirus** joined to at least one heterologous nucleic acid sequence, said autonomous **parvovirus** nucleic acid sequences comprising functional left and right end inverted terminal repeats, said heterologous nucleic acid sequence being located between and operably linked to said nucleic acid sequences comprising said left and right inverted terminal repeats, said vector being in a non-integrating form within a cell after in vitro transfer of said vector.

CLMS(37)

37. The virus particle of claim 36, wherein said heterologous nucleic acid sequence is selected from the group consisting of a heterologous control element and a heterologous coding region.

CLMS(38)

38. The virus particle of claim 37, wherein said **parvovirus** nucleic acid sequences are selected from the group consisting of LuIII **parvovirus**, minute virus of mice, hamster **parvovirus**, feline panleukopenia virus, canine **parvovirus**, porcine **parvovirus**, latent rat virus, mink enteritis virus, human **parvovirus**, bovine **parvovirus**, and Aleutian mink disease **parvovirus** nucleic acid

sequences.

CLMS(39)

39. The virus particle of claim 36, wherein said **parvovirus** nucleic acid sequences comprise a LuIII nucleic acid sequence.

CLMS(40)

40. The virus particle of claim 36, wherein said capsid is selected from the group consisting of LuIII **parvovirus**, minute virus of mice, hamster **parvovirus**, feline panleukopenia virus, canine **parvovirus**, porcine **parvovirus**, latent rat virus, mink enteritis virus, human **parvovirus**, bovine **parvovirus**, and Aleutian mink disease **parvovirus** nucleic acid sequences.

CLMS(41)

41. The virus particle of claim 36, wherein said capsid is selected from the group consisting of LuIII **parvoVirus**, minute virus of mice MVMi, minute virus of mice VMMP, and hamster **parvovirus** H1 capsids.

CLMS(42)

42. The virus particle of claim 36, wherein said capsid comprises a LuIII capsid.

CLMS(43)

43. The virus particle of claim 36, wherein said recombinant-vector is pseudotyped such that said vector is packaged in a capsid of a virus species other than the species of said **parvovirus** nucleic acid sequence.

CLMS(44)

44. The virus particle of claim 36, wherein said **parvovirus** nucleic acid sequences comprise a LuIII nucleic acid sequence and wherein said virus capsid is selected from the group consisting of LuIII **parvovirus**, minute virus of mice, hamster **parvovirus**, feline panleukopenia virus, canine **parvovirus**, porcine **parvovirus**, latent rat virus, and mink enteritis virus capsids.

CLMS(45)

45. The virus particle of claim 36, wherein said **parvovirus** nucleic acid sequences comprise a LuIII nucleic acid sequence and wherein said virus capsid is selected from the group consisting of LuIII **parvovirus**, minute virus of mice MVMi, minute virus of mice VMMP, and hamster **parvovirus** H1 capsids.

CLMS(46)

46. The virus particle of claim 36, wherein infection of said virus particle into a host cell effects transient gene transfer of said heterologous coding region into said cell.

CLMS(47)

47. The virus particle of claim 37, wherein said heterologous control element comprises a **cancer** cell-selective response element, wherein said heterologous coding region encodes a cytotoxic agent, and wherein infection of said virus particle into a host **cancer** cell inhibits **cancer** cell growth.

CLMS (48)

48. A gene delivery vehicle comprising a recombinant vector comprising nucleic acid sequences of an autonomous **parvovirus** joined to at least one heterologous nucleic acid sequence, said autonomous **parvovirus** nucleic acid sequences comprising functional left and right end inverted terminal repeats, said heterologous nucleic acid sequence being located between and operably linked to said nucleic acid sequences comprising said left and right inverted terminal repeats, wherein said vector is in a non-integrating form when transferred into a cell.

CLMS (49)

49. The virus particle of claim 36, wherein said particle exhibits characteristics of an autonomous **parvovirus**, said characteristics comprising high stability, lack of integration, high titer, and maintenance of infectivity upon concentration.

CLMS (50)

50. A gene delivery vehicle comprising a recombinant vector comprising nucleic acid sequences of an autonomous **parvovirus** joined to at least one heterologous nucleic acid sequence, said autonomous **parvovirus** nucleic acid sequences comprising functional left and right end inverted terminal repeats, said heterologous nucleic acid sequence being located between and operably linked to said nucleic acid sequences comprising said left and right inverted terminal repeat, said vector being in a non-integrating form within a cell after in vitro transfer of said vector.

CLMS (51)

51. The gene delivery vehicle of claim 50, wherein said vector is packaged in an autonomous **parvovirus** capsid to form a recombinant virus particle effective to deliver said vector to said host cell.

CLMS (52)

52. The gene delivery vehicle of claim 51, wherein said capsid targets said virus particle to a selected population of host cells.

CLMS (53)

53. The gene delivery vehicle of claim 50, wherein said vector is attached to a carrier effective to deliver said vector to said host cell.

CLMS (54)

54. The gene delivery vehicle of claim 53, wherein said carrier is selected from the group consisting of liposomes and viruses.

CLMS (55)

55. The gene delivery vehicle of claim 52, wherein said heterologous nucleic acid sequence comprises a control element which is operably linked to a coding region, which control element is selectively functional in a particular population of cells and selectively directs expression of said coding region in said cell population.

CLMS (56)

56. The gene delivery vehicle of claim 50, wherein said heterologous nucleic acid sequence encodes an RNA or protein for treating said host cell.

CLMS (57)

57. The gene delivery vehicle of claim 50, wherein said vehicle upon introduction into said host cell is capable of substantially destroying a selected population of host cells, said heterologous nucleic acid sequence comprising a heterologous response element that is selectively expressed by said cell population, said response element being operatively linked to a promoter and to a coding region capable of encoding a compound that is substantially cytotoxic to said cell population.

CLMS (58)

58. The gene delivery vehicle of claim 57, wherein said compound is selected from the group consisting of a diphtheria toxin, an autonomous **parvovirus** NS1 protein, and HSV thymidine kinase.

CLMS (59)

59. A recombinant nucleic acid comprising nucleic acid sequences of an autonomous **parvovirus** joined to a heterologous nucleic acid sequence comprising a heterologous control element or heterologous coding region, said autonomous **parvovirus** nucleic acid sequences comprising functional left and right end inverted terminal repeats, said heterologous nucleic acid sequence being located between and operably linked to said nucleic acid sequences comprising said left and right inverted terminal repeats, wherein said recombinant nucleic acid is in a non-integrating form when transferred into a cell.

CLMS (60)

60. The gene delivery vehicle of claim 50, wherein said heterologous nucleic acid sequence restores the function of a defective gene in said host cell.

CLMS (61)

61. A recombinant nucleic acid comprising nucleic acid sequences of an autonomous **parvovirus** joined to a heterologous nucleic acid sequence comprising a heterologous control element or heterologous coding region, said autonomous **parvovirus** nucleic acid sequences comprising functional left and right end inverted terminal repeats, said heterologous nucleic acid sequence being located between and operably linked to said nucleic acid sequences comprising said left and right inverted terminal repeats, said recombinant nucleic acid being in a non-integrating form within a cell after in vitro transfer of said recombinant nucleic acid.

CLMS (62)

62. The recombinant nucleic acid of claim 61, wherein said heterologous nucleic acid sequence comprises a heterologous control element operatively linked to a heterologous coding region.

CLMS (63)

63. The autonomous **parvovirus** helper construct pSVLu.

CLMS (64)

64. A non-integrating vector comprising nucleic acid sequences of an autonomous **parvovirus** joined to at least one heterologous nucleic acid sequence, the expression of which is regulated by a control element, said autonomous **parvovirus** nucleic acid sequences comprising functional left and right end inverted terminal repeats, said

heterologous nucleic acid sequence being located between and operably linked to said nucleic acid sequences comprising said left and right inverted terminal repeats, said autonomous **parvovirus** nucleic acid sequences being devoid of nucleic acid sequences encoding either structural or nonstructural autonomous **parvovirus** polypeptides.

CLMS (65)

65. The vector of claim 64, wherein said vector is packaged within an autonomous **parvovirus** capsid that target selected cell types.

CLMS (66)

66. The vector of claim 64, wherein said vector is capable of effecting transient expression of said heterologous nucleic acid sequence in a host cell.

CLMS (67)

67. A method for transferring a heterologous nucleic acid sequence into a host cell in vitro comprising introducing into said cell a recombinant vector comprising nucleic acid sequences of an autonomous **parvovirus** joined to at least one heterologous nucleic acid sequence selected from the group consisting of a heterologous control element and a heterologous coding region, said autonomous **parvovirus** nucleic acid sequences comprising functional left and right end inverted terminal repeats, said heterologous nucleic acid sequence being located between and operably linked to said nucleic acid sequences comprising said left and right inverted terminal repeats, wherein said vector is in a non-integrating form when transferred into a cell.

CLMS (68)

68. The vector of claim 67, wherein expression of said cytotoxic agent is sufficient to destroy selected cell types.

CLMS (69)

69. A method for transferring a heterologous nucleic acid sequence into a host cell in vitro comprising introducing into said cell a recombinant vector comprising nucleic acid sequences of an autonomous **parvovirus** joined to at least one heterologous nucleic acid sequence selected from the group consisting of a heterologous control element and a heterologous coding region, said autonomous **parvovirus** nucleic acid sequences comprising functional left and right end inverted terminal repeats, said heterologous nucleic acid sequence being located between and operably linked to said nucleic acid sequences comprising said left and right inverted terminal repeats, said vector being in a non-integrating form within a cell after in vitro transfer of said vector.

CLMS (70)

70. A method for transferring a heterologous nucleic acid sequence into a cell in vitro comprising infecting said cell with a recombinant virus particle comprising a recombinant vector packaged in an autonomous **parvovirus** capsid, said vector comprising nucleic acid sequences of an autonomous **parvovirus** joined to at least one heterologous nucleic acid sequence selected from the group consisting of a heterologous control element and a heterologous coding region, said autonomous **parvovirus** nucleic acid sequences comprising functional left and right end inverted terminal repeats, said heterologous nucleic acid sequence being located between and operably linked to said nucleic acid sequences comprising said left and right inverted terminal repeats, wherein said vector is in a non-integrating form when transferred into a cell.

CLMS (71)

71. A method for substantially destroying a selected population of cells comprising administering to an in vitro cell population at least one recombinant vector comprising autonomous **parvovirus** nucleic acid sequences joined to at least one heterologous nucleic acid sequence having a heterologous response element that is selectively functional in said cell population, said response element being operably linked to a promoter and to a coding region encoding a compound that is substantially cytotoxic to said cell population, said autonomous **parvovirus** nucleic acid sequences comprising functional left and right end inverted terminal repeats, said heterologous nucleic acid sequence being located between and operably linked to said nucleic acid sequences comprising said left and right inverted terminal repeats, wherein said vector is in a non-integrating form when transferred into a cell.

CLMS (72)

72. A method for transferring a heterologous nucleic acid sequence into a cell in vitro comprising infecting said cell with a recombinant virus particle comprising a recombinant vector packaged in an autonomous **parvovirus** capsid, said vector comprising nucleic acid sequences of an autonomous **parvovirus** joined to at least one heterologous nucleic acid sequence selected from the group consisting of a heterologous control element and a heterologous coding region, said autonomous **parvovirus** nucleic acid sequences comprising functional left and right end inverted terminal repeats, said heterologous nucleic acid sequence being located between and operably linked to said nucleic acid sequences comprising said left and right inverted terminal repeats, said vector being in a non-integrating form within a cell after in vitro transfer of said vector.

CLMS (73)

73. A method for substantially destroying a selected population of cells comprising administering to an in vitro cell population at least one recombinant vector comprising autonomous **parvovirus** nucleic acid sequences joined to at least one heterologous nucleic acid sequence having a heterologous response element that is selectively functional in said cell population, said response element being operably linked to a promoter and to a coding region encoding a compound that is substantially cytotoxic to said cell population, said autonomous **parvovirus** nucleic acid sequences comprising functional left and right end inverted terminal repeats, said heterologous nucleic acid sequence being located between and operably linked to said nucleic acid sequences comprising said left and right inverted terminal repeats, said vector being in a non-integrating form within a cell after in vitro transfer of said vector.

CLMS (74)

74. The method of claim 73, wherein said coding region encodes an antisense RNA, a ribozyme, an RNA-based drug, or a cytotoxic protein.

CLMS (75)

75. The method of claim 73, wherein said selected population of cells comprise **cancer** cells or cells infected with an infectious agent.

CLMS (76)

76. A method for producing a recombinant virus particle useful in the delivery of a gene to a targeted cell, comprising:

- (a) co-transfecting a host cell in vitro with a recombinant

non-integrating vector comprising acid sequences of an autonomous **parvovirus** joined to at least one heterologous nucleic acid sequence and with a helper construct that effects at least one function selected from the group consisting of amplification of said vector and packaging of said vector in a **parvovirus** capsid, said autonomous **parvovirus** nucleic acid sequences comprising functional left and right end inverted terminal repeats, said heterologous nucleic acid sequence being located between and operably linked to said nucleic acid sequences comprising said left and right inverted terminal repeats; and (b) culturing said transfected host cell in an effective medium to produce a recombinant virus particle said vector being in a non-integrating form within a cell after in vitro transfer of said vector.

CLMS (77)

77. The method of claim 76 wherein said helper construct is pSVLu.

CLMS (78)

78. A method for producing a heterologous product selected from the group consisting of RNA products and protein products comprising:  
(a) transfecting a host cell in vitro with a recombinant non-integrating vector comprising nucleic acid sequences of an autonomous **parvovirus** joined to at least one heterologous nucleic acid sequence encoding said product, said autonomous **parvovirus** nucleic acid sequences comprising functional left and right inverted terminal repeats, said heterologous nucleic acid sequence being located between and operably linked to said nucleic acid sequences comprising said left and right inverted terminal repeats; and  
(b) culturing said transfected host cell in an effective medium to produce said product.

CLMS (79)

79. The method of claim 78, wherein said host cell is further transfected with a helper construct that effects replication of said vector.

CLMS (80)

80. A recombinant vector comprising nucleic acid sequences of an autonomous **parvovirus** joined to at least one heterologous nucleic acid sequence, said autonomous **parvovirus** nucleic acid sequences comprising functional left and right end inverted terminal repeats, said heterologous nucleic acid sequence being located between and operably linked to said nucleic acid sequences comprising said left and right inverted terminal repeats.

CLMS (81)

81. A recombinant virus particle comprising a recombinant vector packaged in an autonomous **parvovirus** capsid, said vector comprising autonomous **parvovirus** nucleic acid sequences joined to at least one heterologous nucleic acid sequence, said autonomous **parvovirus** nucleic acid sequences comprising functional left and right end inverted terminal repeats, said heterologous nucleic acid sequence being located between and operably linked to said nucleic acid sequences comprising said left and right inverted terminal repeats.

CLMS (82)

82. A gene delivery vehicle comprising a recombinant vector comprising autonomous **parvovirus** nucleic acid sequences joined to at least one heterologous nucleic acid sequence, said autonomous **parvovirus**

nucleic acid sequences comprising functional left and right end inverted terminal repeats, said heterologous nucleic acid sequence being located between and operably linked to said nucleic acid sequences comprising said left and right inverted terminal repeats.

CLMS(83)

83. A recombinant nucleic acid comprising autonomous **parvovirus** nucleic acid sequences joined to a heterologous nucleic acid sequence comprising a heterologous control element or a heterologous coding region, said autonomous **parvovirus** nucleic acid sequences comprising functional left and right end inverted terminal repeats, said heterologous nucleic acid sequence being located between and operably linked to said nucleic acid sequences comprising said left and right inverted terminal repeats.

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